



Yoga in Neuro-Psychiatry

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Yoga is one of the commonest forms of complementary and alternative medicine therapies, which is increasingly being practiced worldwide. It is an ancient Indian practice with its roots in Hindu religion based on the principles of mind-body medicine. The word “yoga” comes from the Sanskrit “yuj,” meaning “yoke” or “union.”

The three essential elements of yoga are: asanas (postures), pranayama (breathing exercises), and dhyana (meditation) [1]. These three components are practiced through multiple steps comprising of *yama* (moral codes, self-control), *niyama* (self-purification and process for maintaining morality), *asana* (posture), *pranayama*, (breath control), *pratyahara* (governing sense), *dharana* (concentration), *dhyana* (meditation), and *samadhi* (supreme contemplation and meditation) [2].

Yoga has been used to treat a variety of body ailments including neurological and psychiatric disorders. Multiple studies have documented the beneficial effects of yoga suggesting numerous mechanisms of its action [3]. The asanas are the aerobic component and may stimulate the central nervous system release of endorphins, monoamines, and brain-derived neurotrophic factor (BDNF) in the hippocampus. The pranayama and dhyana components may regulate the emotional responses by reducing the sympathetic and increasing the parasympathetic tone and improve the cognitive functioning by increasing the EEG synchrony and coherence. An increase in melatonin and decrease in cortisol have been associated with the meditative component of yoga. A rise in melatonin promotes sleep, stimulates immune system and reduces blood pressure. Numerous studies have found a positive correlation between levels of cortisol, negative effects, and depression.

Different forms of yoga have shown effectiveness in treatment of many chronic diseases such as cancer, asthma, diabetes, arthritis, fibromyalgia, cardiac problems etc., where stress is considered to play an important role [3]. Though the studies are limited by their sample sizes and methodology discrepancies, yoga has shown benefit for an array of neuropsychiatric disorders.

Three non-randomized and two randomized controlled trials (RCTs) have assessed the effects of yoga in patients with epilepsy. The studies report an improvement on various parameters such as seizure frequency, seizure index, EEG alterations (increase in alpha and beta frequencies), autonomic functioning and quality of life [4].

Three RCTs have demonstrated effectiveness of yoga in curbing headache frequency, intensity and duration in migraineurs [5-7]. Another RCT has shown improvement in vascular endothelial functioning in migraine subjects receiving yoga compared to controls [8]. One RCT has shown no significant effect of yoga in migraine for the primary outcome variables as compared to conventional care [9].

Multiple sclerosis (MS) is a debilitating and demyelinating disease that damages the myelin sheath surrounding the spinal cord. The first reported RCT of yoga in MS demonstrated that yoga improved fatigue to a comparable traditional aerobic exercise regime but either was not able to have any improvement in cognitive functioning [10]. A later RCT reported yoga to be beneficial in improving attention but not in

fatigue (which also was improved in the sport climbing group), mood, spasticity or other executive functioning [11]. A RCT found yoga therapy to be more effective in improving balance, walking endurance, fatigue, depression and anxiety in MS as compared to controls but did not differ from treadmill training [12]. The study by Hogan et al. reported yoga to be beneficial only for improving balance but not for other parameters of fatigue, physical and psychological impact of MS or walking endurance [13]. Pranayama, hatha and raja yoga was shown in a RCT to improve physical pain and quality of life of women with MS [14]. An exploratory study reported improvement in functional strength, balance, and peak expiratory flow in patients with MS receiving Anand yoga [15]. The study also showed a trend towards improving quality of life in such patients. A prospective case series reported integrated yoga to improve neurogenic bladder dysfunction in MS [13].

The only systemic review of yoga therapy in stroke patients found 5 RCTs, 4 single case studies and one qualitative research study reporting positive results, including improvements in cognition, mood, and balance and reductions in stress concluding that yoga and mindfulness could be clinically valuable self-administered intervention options for stroke rehabilitation [16,17]. A recent RCT reported that yoga intervention improved the quality of life in stroke patients but not the objective motor function measures such as task-orientated function, balance or mobility [18].

A single RCT exhibited that yoga was more effective than wrist splinting in improving grip strength, pain reduction and mending Phalen's sign in patients with carpal tunnel syndrome [19].

Multiple studies have been conducted for evaluating the effect of yoga on depression. A systemic review included 12 RCTs with 619 participants and concluded that despite methodological drawbacks, the pooled analyses suggest positive evidence for effects [20]. Studies also suggest that yoga interventions improve depression severity in patients with a co-morbid disorder like cancer or fibromyalgia [21].

A systematic review and meta-analysis of yoga therapy for schizophrenia included 5 RCTs with a total of 337 patients and found only moderate evidence for short-term effects on quality of life and no effect on positive or negative symptoms and social functioning [22].

There have been 3 RCTs assessing the role of yoga in post-traumatic stress disorder (PTSD). Yoga breath intervention was observed to be more beneficial compared to wait-listed controls in reducing post traumatic

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symptoms [23]. Another RCT reported decrease in sadness but no change in heart rate variability by yoga therapy in comparison to wait-list control group of PTSD [24]. Trauma-informed yoga intervention was demonstrated as superior to supportive women's health education in an RCT comprising of 64 women with PTSD [25].

Studies have also demonstrated symptom improvement in other psychiatric disorders such as by utilizing Sudarshan Kriya Yoga (SKY) course in generalized anxiety disorder [26].

Although yoga is suggested to be relatively safe and well tolerated, there are risks of overstretching, strains, fractures and dehydration [3]. It can worsen glaucoma as the inverted asanas increase the intraocular pressure by raising episcleral venous pressure and choroidal volume due to vascular enlargement. Inverted postures pose the risk of a sudden drop in blood pressure, which can induce a stroke or heart attack particularly in susceptible individuals. Yoga also lowers blood glucose levels posing a danger for diabetic patients. Bikram yoga, which is practiced in very hot temperatures, is likely risky for patients with multiple sclerosis [27]. The majority of RCTs have not reported any safety data on yoga.

The available research is limited by small sample size, few randomized studies, inadequate control, diversely modified yoga practices, limited assessments and lack of safety data. This precludes any firm conclusions on efficacy of yoga on the various psychiatric and neurological disorders and advocate requirement of more research to decisively assess the validity of applying yoga as a mainstream therapeutic treatment for neuro-psychiatric disorders.

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